3. OUTLINE OF PHONEMES

3.1. CHART OF PHONEMES

	Bilabial	Dental	Alveolar	Velar
OBSTRUENT	Non-prenasalized /p/	/s/	/ř/	/k/
	Prenasalized/mb/	/ndz/	/nd/	/ŋg/
NASAL	/m/	/n/	/n/	/ŋ/
LATERAL		/ɬ/	/ǐ/	/ɬ/
SEMI VOWELS	/w/		/y/	

		Front	Central	Back
VOWELS	HIGH	/i/		/u/
		/ɪ/		
	MID	/ɛ/		/o/
	LOW		/a/	

4. DESCRIPTION OF PHONEMES AND ALLOPHONES

4.1. CONSONANTS -

Phonemes	Allophones	
/p/	(p)	Voiceless bilabial stop occurs word initial and medial.
	(b)	Voiced bilabial stop occurs in fluctuation with (p).
	(p^h)	Voiceless bilabial aspirated stop occurs word and utterance finally and is mutually exclusive with (p) (b).
	($p^{ə}$)	Voiceless bilabial stop with voiced central vocoid release occurs in free variation with (p^h) word finally as a transition between words in a phrase.

/kupú/	(kupú)	'cloud'
/pɛŋ/	(pɛŋ)	'black'
/pimɛ́/	(pimɛ́)	'bee'
/ndup/	(ndup^h)	'fire'
/mo̱áp/	(mo̱áp^h)	'potato '
/amb/	(amp^h)	'woman'
/ndup ka̱/	(ndup^{ə} ka̱/ndup^h ka̱)	'start fire!'
/mo̱áp řa̱/	(mo̱áp^h ta̱/mo̱áp^{ə} řa̱)	'two potatoes'

Phonemes	Allophones	
/mb/	(mb)	Voiced prenasalized bilabial stop occurs word initially and medially.

Phonemes	Allophones	
	(mp)	Voiceless prenasalized bilabial stop occurs word medially in fluctuation with (mb).
	(mp^{h})	Voiceless prenasalized bilabial aspirated stop occurs word finally.
	(mpə)	Voiceless prenasalized bilabial stop with vocoid release occurs in free fluctuation with (mp^{h}) utterance medial as a transition between words.

/mbɛn/	(mbɛn)	'bean'
/sɛmbɩ̀ɨ̀/	(tɛmbɩ̀ɨ̀/tɛmpɩ̀ɨ̀)	'shake'
/amb/	(amp^{h})	'woman'
/amb řaɨ̀/	(amp^{h} taɨ̀/ampə řaɨ̀)	'two women'

Phonemes	Allophones	
/s/	(s)	Voiceless dental grooved fricative occurs initially fluctuating with (t) and (ts); medially and finally fluctuating with (ts).
	(ts)	Voiceless dental grooved affricate occurs word initial and final fluctuating with (s).
	(t)	Voiceless dental stop occurs word initial and medial in fluctuation with (s) and (ts).

/kɩs/	(kɩs/kɩts)	'bad'
/sɛ/	(tɛ/tsɛ)	'take it'
/sɩmb/	(tɩmp^{h}/tsɩmp^{h})	'foot'

/wusi/ (wusi/wuti) 'cat'

/ɔ̝lsɪn/ (ɔ̝ltɪn/ɔ̝ltsɪn) 'yesterday'

Phonemes	Allophones	
/ndz/	(ndz)	Voiced prenasalized dental grooved affricate occurs word initially, medially, and finally.
	(nts)	Voiceless prenasalized dental grooved affricate occurs word initially and medially in fluctuation with (ndz) and fluctuates with (ns) and (ndz) finally.
	(ns)	Voiceless prenasalized dental grooved fricative occurs word finally in fluctuation with (nts) and (ndz).
	(ndzʿ)	Voiced prenasalized dental grooved affricate with slight high front vocoid release occurs freely fluctuating with (ndz) in consonant clusters preceding heterorganic stops and nasals.

/ndzi/ (ndzi) 'cold'

/ndzɪ̝ɪ/ (ndzɪ̝ɪ/ntsɪ̝ɪ) 'where'

/kandzɪp/ (kandzɪpʰ/kantsɪpʰ) 'star'

/ɛndz/ (ɛndz/ɛnts/ɛns) 'waste'

/ɛndzpɪn/ (ɛndzʿpɪn) 'we all worked'

Phonemes	Allophones	
/ř/	(ř)	Voiced alveolar flapped vibrant occurs utterance medial in fluctuation with (t)
	(r̃)	Voiced alveolar trilled vibrant occurs in free fluctuation with (ř).
	($t^{\check{R}}$)	Voiceless alveolar stop with voiceless flapped vibrant release occurs following (l) word finally.
	(t^h)	Voiceless alveolar aspirated stop occurs in free fluctuation with ($t^{\check{R}}$)
	(R̃)	Voiceless alveolar trilled vibrant occurs postvocalically word finally.
	(t)	Voiceless alveolar stop occurs word initially following another word of an utterance in fluctuation with (ř).

/ařím/ (ařím/ařím) 'father'

/konu kumb řonúm/(konu kump^h tonúm/konu kump^h řonúm) 'It is raining'

/ɛř/ (ɛR̃) 'work'

/olř/ (olt$^{\check{R}}$/olt^h) 'long'

Phonemes	Allophones	
/nd/	(nd)	Voiced prenasalized alveolar stop occurs word initially and medially.
	(nt)	Voiceless prenasalized alveolar stop occurs in fluctuation with (nd).

(nt^h)	Voiceless prenasalized alveolar aspirated stop occurs word final.
($nt^{\check{R}}$)	Voiceless prenasalized alveolar stop with voiceless flapped vibrant release occurs word finally in free fluctuation with (nt^h).
($nt^{ə}$)	Voiceless prenasalized alveolar stop with vocoid release occurs in free fluctuation with (nt^h) utterance medial as a transition between words.

/ndup/ ($ndup^h$/$ntup^h$) 'fire'

/kɛndá̰ɭ/ (kɛntá̰ɭ/kɛndá̰ɭ) 'place name'

/nond/ ($nont^h$/$nont^{\check{R}}$) 'I am eating'

/ond kaipí/(ont^h kaipí/$ont^{ə}$/ kaipi) 'kind of tree'

Phonemes	Allophones	
/k/	(k)	Voiceless velar stop occurs word initial and medial.
	(g)	Voiced velar stop occurs in fluctuation with (k).
	(k^h)	Voiceless velar aspirated stop occurs word final.
	($k^{ə}$)	Voiceless velar stop with voiced central vocoid release occurs in free fluctuation with (k^h) utterance medial as a transition between words.

Preceding /a/ and /o/ in some words /k/ and /ku/ occur in free variation.

/ka/	(ka)	'good'
/aká/	(aká/agá)	'sweet potato'
/kombú/	(kombʊ́)	'marita'
/kon/, /kuon/		'string bag'
/kondúk/, /kuondúk/		'shirt'
/ndok/	(ndɔk^{h})	'frog'
/nɪřɪk/	(nɪřɪk^{h})	'inside'
/pɛk řo/	(pɛk^{h} to/pɛk^{ə} řo)	'peel'

Phonemes	**Allophones**	
/ŋg/	(ŋg)	Voiced prenasalized velar stop occurs word initially and medially.
	(ŋk)	Voiceless prenasalized velar stop occurs in fluctuation with (ŋg).
	(ŋk^{h})	Voiceless prenasalized aspirated velar stop occurs word finally.
	(ŋk^{ə})	Voiceless prenasalized velar stop occurs in free fluctuation with (ŋk^{h}) utterance medial as a transition between words.

/ŋgo̱ɨ̱/	(ŋgo̱ɨ̱/ŋko̱ɨ̱)	'strong pit-pit'
/ŋgupú/	(ŋgupʊ́)	'mouth'
/móŋgɛ/	(móŋgɛ)	'line of people'
/aŋg/	(aŋk^{h})	'they stood up'
/aŋg punmún/	(aŋk^{h} punmún/ aŋk^{ə} punmún)	'they went'

Phonemes	Allophones			
/m/	(m)	Voiced bilabial nasal occurs word initially, medially, and finally.		
		/mɛ/	(mɛ)	'taro'
		/omú/	(ɔmʊ́)	'fish'
		/nɪm/	(nɪm)	'you 'sing'
/n/	(n)	Voiced dental nasal occurs word initially, medially and finally.		
		/ɛní/	(ɛní)	'sun'
		/nɪm/	(nɪm)	'you'
		/kon/	(kon)	'face'
/n/	(n)	Voiced alveolar nasal occurs word initially, medially and finally.		
		/kon/	(kon)	'belium'
		/nol̪̟/	(nol̪̟)	'water'
		/ɛnɪ́m/	(ɛnɪ́m)	'they'

Phonemes	Allophones			
/ŋ/	(ŋ)	Voiced velar nasal occurs word initial, medial and final.		
		/ŋɛndz/	(ŋɛnts)	'skin'
		/kaŋɪ́l̪̟/	(kaŋɪ́l̪̟)	'boy'
		/kuŋ/	(kuŋ)	'pig'
		/pɛŋ/	(pɛŋ)	'head'

/ɬ̠/ (ɬ̠) Voiceless dental lateral fricative occurs word final.

(l̠) Voiced dental lateral fricative occurs intervocallically.

(l) Voiced alveodental lateral occurs intervocalicly,preceding a consonant.

/mo ɬ̠ á ɬ̠/ (mo l á ɬ̠) I'm not staying'

/ŋga ɬ̠/ (ŋga ɬ̠) 'pencil'

/ɛ ɬ̠ ɪ́p/ (ɛ l ɪ́ pʰ)'joined together'

/mu ɬ̠/ (mu ɬ̠) 'point of spear'

/o ɬ̠ s ɪ́n/ (o l t ɪ́n)'yesterday'

/ǐ/ (ǐ) Voiced alveolar flapped lateral occurs word intervocalically.

(l) Voiced alveolar lateral occurs preceding /ř/.

/mǔlʊ́m/ (mǔlʊ́m)'he was staying before'

/ngǒlʊ́m/ (ngǒlʊ́m)'pit pit'

/pǎlɪ́ŋ/ (pǎlɪ́ŋ) 'pig fence'

/kɛ̌lɪ́p/ (kɛ̌lɪ́pʰ)'cough of an old person'

/kǎlř/ (kaltʳ̌) 'I cooked'

/ɬ̠/ (ɬ̠) Voiceless velar lateral fricative occurs word finally.

(l̠) Voiced velar lateral fricative occurs intervocalically.

(ɬ̊ʷ) **Voiceless velar lateral fricative with voiced central vocoid release occurs word finally as a transition between words.**

/ɛɬ̊ɪ́p/	(ɛɬ̊ɪ́pʰ)	'you (2)'
/noɬ̊/	(noɬ̊)	'water'
/kuɬ̊á/	(kuɬ̊á)	'dry'
/moɬ̊/	(moɬ̊)	'I stay'
/muɬ̊ɛ́ɬ̊/	(muɬ̊ɛ́ɬ̊)	'you (2) stay'
/nonɛ̄nɛ́ɬ̊ nɪ/	(nonɛ̄nɛ́ɬ̊ʷ nɪ)	'you (2) cannot eat, you say'

Phonemes	Allophones			
/w/	(w)	Voiced bilabial high closed rounded semi vocoid occurs word initially and medially.		
		/wu/	(wʊ)	'man'
		/owá/	(owá)	'yes'
		/wi/	(wi)	'nothing'
		/owú/	(ɔwʊ́)	'dog'
/y/	(y)	Voiced high close front unrounded semi vocoid occurs initial and medial.		
		/siyo/	(tsiyo)	'get it!'
		/ya/	(ya)	'here'
		/puiyo/	(puiyo)	'you go!'
		/yo/	(yo)	'get it!'

4.2. VOWELS

Vowels differ in inherent basic length according to tongue position, the low vowel /a/ being the longest, /ɩ/, /i/, and /u/ the shortest. Vowels tend to be longer in stressed final position than elsewhere in words of the same number of syllables.

Phonemes	Allophones			
/i/	(i)	Voiced high closed front unrounded vocoid occurs word medially and finally.		
		/kip/	(kip^{h})	'a name'
		/wi/	(wi)	'nothing'
		/pimɩ́/	(pimɩ́)	'bee'
		/wɛmbí/	(wɛmbí)	'snake'
/ɩ/	(ɩ˞)	Voiced high open front backed unrounded vocoid occurs preceding lateral consonants and fluctuates freely with (ɨ) following consonant clusters immediately preceded by front and central vocoids.		
	(ɨ)	Voiced high open central unrounded vocoid occurs following consonant clusters immediately preceded by front and central vocoids.		
	(ɩ)	Voiced high open front unrounded vocoid elsewhere.		

/kunɪ́/	(kunɪ́)	'food'
/ɛpɪ́/	(ɛpɪ́)	'something'
/kɪs/	(kɪs)	'bad'
/ounɪ́/	(ounɪ́)	'together'
/ołsɪ́n/	(oltɪ́n)	'yesterday'
/ɛndzɪŋɪ́ł̠/	(ɛndzɪŋɪ́ł̠)	'dl.worked'
/nɪł̠/	(nɪ́ł̠)	'mark on face'
/mułn̄ɛndzpɪ́n/	(mułn̄ɛndzpɪ́n)	"we didn't stay'
/kuřnářpɪ̄n/	(kuřnářpɪ̄n)	'we didn't find it'

Phonemes	Allophones	
/ɛ/	(ə)	Voiced mid close central unrounded vocoid occurs in unstressed second syllable in multi-syllable words following non-dental laterals following /ɛ/ in initial syllable.
	(e)	Voiced mid close front unrounded voiced occurs as first member of complex nuclei.
	(ɛ)	Voiced mid open front unrounded vocoid occurs elsewhere.

/tɛłɛnɛ̄mbí/	(tɛłɛnɛ̄mbí)	'I will not plant'
/ɛndɛ́im/	(ɛndɛ́im)	'one'
/sɛ/	(tɛ)	'get it'
/ɛnɪ/	(ɛnɪ)	'sun'
/ɛm/	(ɛm)	'goroka nut'
/mɛř/	(mɛ̃R̃)	'north'
/eɪ/	(eɪ)	'up'

/bɛǐɛmbɩ́ɨ̞/ (bɛǐəmbɩ̞́ɨ̞) 'we two will read'

/wɛɨ̞ɛpi/ (wɛɨ̞əpi) 'clan name'

Phonemes	Allophones	
/a/	(ʌ)	Voiced mid open central unrounded vocoid occurs word finally following a lateral and in free fluctuation with (ʌ̂) word finally following /w/.
	(æ)	Voiced low close front unrounded vocoid occurs word medially in free fluctuation with (a) preceding velar laterals.
	(ʌ̂)	Voiced mid open central raised unrounded vocoid occurs in free fluctuation with (ʌ) word finally following /w/.
	(a)	Voiced low open central unrounded vocoid occurs elsewhere.

/am/	(am)	'milk'
/aká/	(aká)	'sweet potatoe'
/mam/	(mam)	'his mother'
/s̲aɨ̞ɩ́m/	(t̲æɨ̞ɩ́m/taɨ̞ɩ́m)	'it is here'
/paɨ̞ɩ́/	(pæɨ̞ɩ́/paɨ̞ɩ́pʰ)	'male'
/pɩɨ̞á/	(pɩ̞ɨ̞ʌ́)	'girl's name;
/ařuwá/	(ařuwʌ̂́/ařʊwʌ́)	'pumpkin'

/u/	(u)	Voiced high close back round vocoid, occurs only in CV syllables medially and finally. It usually follows velar stops and fluctuates with (ʊ) when preceded by (k) and followed by nasal or a stop. (u) also occurs in the environment of liquids.

(ᵢʊ) Voiced high close front unrounded vocoid on-glide to voiced high open back rounded vocoid occurs between two dental consonants, and following dentals in open monosyllables.

(ɨ) Voiced high open central unrounded vocoid occurs following dental consonants following back vowels.

(ï) Voiced high open back unrounded vocoid occurs in open final syllables following alveolar consonants following back vowels.

(ʊ) Voiced high open back rounded vocoid occurs elsewhere.

/ndzu/	(ndzᵢʊ)	'man's name'
/kun/	(kun/kʊn)	'straight place'
/wu/	(wʊ)	'man'
/nomú/	(nɔmʊ́)	'louse'
/kuɬá/	(kuɬʌ́)	'grass'
/ndup/	(ndʊpʰ)	'fire'
/kunúɬ/	(kunʊ́ɬ/kʊnʊ́ɬ)	'kind of greens'
/nundz/	(nᵢʊnts)	'I ate'
/pundzúŋ/	(pundzɨ́ŋ)	'they went'
/opřú/	(opřḯ)	'lizard'
/tonú/	(tonḯ)	'up'

Phonemes	Allophones	
/o/	(o)	Voiced mid, close back, rounded vocoid occurs word initial, medial and final.
	(ɔ)	Voiced, mid, open back, rounded, vocoid occurs word initial, medial and fluctuates with (o).
	(ə)	Voiced mid close central rounded vocoid occurs in unstressed second syllable in multi-syllable words following non-dental nasals and prenasalized stops following /o/ in initial syllable.

/omb/	(omp^h/ɔmp^h)	'sugar'
/no/	(no)	'eat!'
/op/	(op^h/ɔp^h)	'yam'
/řokú/	(tɔkʊ́/tɔgʊ́)	'tobacco'
/pop/	(pɔp^h/pop^h)	'wind'
/nonomún/	(nonəmʊ́n)	'they will eat'
/kongonúm/	(kongənʊ́m)	'they are biting'

1.2. SYMBOLIZATION

Parentheses ( ) represents the phonetic writing.

Brackets / / represents the phonemic writing.

Underline (_) is used to symbolize dental position.

The dot (.) is used to symbolize velar position

The plus (+) symbolizes fricativeness.

The line through (-) is used to symbolize voicelessness.

Healey, Alan, editor. 1973. *Phonologies of three languages of Papua New Guinea.* Workpapers in Papua New Guinea Languages, 2. Ukarumpa: Summer Institute of Linguistics. 108 p.